

Sleep Problems among Pre-School Children in Qazvin, Iran

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Abstract

Background: Sleep problems are one of the main health issues raised by families. Therefore, we aimed to evaluate the sleep problems of pre-school children in Iran.

Methods: Five hundred and seventy-nine children aged 3–6 years were randomly recruited from 15 kindergartens in the city of Qazvin in Iran. The Iranian version of BEARS (Bedtime problems, Excessive daytime sleepiness, Awakenings during the night, Regularity and duration of sleep and Snoring) and the Children's Sleep Habits questionnaire (CSHQ) were completed by interviewers. Data analysis was performed using SPSS version 19. The data were analysed with a Student's t-test, chi-square and Fisher's exact tests. A P value < 0.05 was considered significant.

Results: The study population consisted of 299 boys (51.6%) and 280 (48.3%) girls with a mean age of 4.1 years (SD 0.8). The mean body mass index (BMI) of the children was 15 (SD 2.1). The average sleep duration among the children was 10:54 h/day (SD 00:48). They went to bed late (23:18 h SD 00:48) and woke early (09:26 h; SD 01:00). Daytime sleepiness was reported by 6.9% of the participants. The incidence of awakening during the night, sleep-disordered breathing and snoring was 13.9%, 1.2% and 2.7%, respectively. Most of the children shared a room with their parents (87%) ($P > 0.05$).

Conclusion: The children had sleep-related problems, including a late bedtime, delayed sleep onset, daytime sleepiness, midnight awakening, sleep-disordered breathing, and snoring. Sharing a room was very common among the Iranian children.

Keywords: sleep, habits, child, pre-school, questionnaires

Introduction

Poor sleep in children may have negative effects on their daily functioning, mood, behaviour, school performance and parenting level (1–3). Moreover, sleep problems have adverse effects on quality of life. In some cases, sleep problems may be a symptom of attention-deficit/hyperactivity disorder (4,5). Sleep disorders are one of the main health issues raised by families, and it is estimated that more than 25% of children experience sleep problems during their childhood (2,6). According to the literature, the prevalence of parental-reported sleep problems ranges from 25% to 50% (7,8). In a study conducted in 2009 in Qazvin (8), 41.4% of children had sleep-onset latency problems. However, a later study, performed in 2010, (9) reported a figure of 21.9%. The same study found that 56% of children had a late bedtime (22.00 h or later). Mohammadi

(2007) (10), reported that bedtime problems and sleep-disordered breathing were common among 2–6 year-old Iranian children (56.4% and 17.8%, respectively) and among 2–12 year-old American children (16.3% and 13.1%, respectively). Snoring was reported in 3–12% of Malaysian pre-schoolers (11). In a United States study, (12), the prevalence of sleep disorders among 4–5 year-old pre-school children was 4.3%. The prevalence of mild and moderate/severe sleep problems among Australian pre-school children was 19.8% and 13.8%, respectively (3). In a Chinese study (13), the prevalence of sleep disorder domains among Chinese pre-school children varied between 0.7% and 8.5%. In the same study, the sleep duration of 62.4% of Chinese pre-schoolers was 10–12 h.

Data on the sleep of healthy children are required to assess sleep problems in clinical

practice, and there are limited studies in the literature (8–10,16,19,23) on the sleep habits and sleep-related problems of Iranian children. The findings from other countries cannot be generalised to Iran. Therefore, we examined the sleep habits and prevalence of sleep disturbances in healthy Iranian pre-schoolers.

Materials and Methods

The study was approved by the research and ethics committee of Qazvin University of Medical Science in Iran. One-stage cluster sampling was used, with the entire population (region) divided into groups, or clusters. A random sample of these clusters was then selected. Qazvin city is divided into three urban districts, with 32 kindergartens. Fifteen kindergarten clusters were randomly selected. Children who were taking any medication treatment or had metabolic or psychological disorders were excluded. The guardians of 600 children signed a consent form. Of these, the questionnaires of 579 children (299 boys and 280 girls) were usable for the data analysis. Iranian versions of two questionnaires, the Children's Sleep Habits questionnaire (CSHQ) (6,8,14,16) and BEARS (Bedtime problems, Excessive daytime sleepiness, Awakenings during the night, Regularity and duration of sleep and Snoring) (17), were completed by the interviewers. Bedtime problems in BEARS include resistance to going to bed and sleep onset latency (i.e. the time between going to bed and sleeping) > 20 minutes (18). The BEARS sleep screening tool is divided into five major sleep domains, providing a comprehensive screen of the major sleep disorders affecting children aged 2–18 years (15,17). Each sleep domain has a set of age-appropriate 'trigger questions' for use in the clinical interview. The CSHQ screens common sleep problems in children aged 2–12 years and consists of 33 items and 8 subscales. The items are rated on a 3-scored Likert scale (rarely = 0–1 night per week; sometimes = 2–4 nights per week; usually = 5–7 nights per week). Each question relates to the previous week, and is scored as 0, 1 and 2, respectively. A total score of more than 33 is the cut off and indicates sleep problems and sleep disorders in children (14,16–18). The data were collected from the mothers and trained questioners in three days.

The data analysis was performed using SPSS version 19 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were summarised as either the mean and standard deviation or percentages where appropriate. The data were analysed using

the student *t* test, chi-square and Fisher's exact tests. A probability value (*P*) of 0.05 or less was considered significant.

Results

The study population consisted of 299 boys (51.6%) and 280 (48.3%) girls, with a mean age of 4.1 years (SD 0.8). The mean body mass index (BMI) of the children was 15.0 (SD 2.1) ($P > 0.05$). The average sleep duration among the children was 10:54 h/day (SD 00:48), and they went to bed late (23.18 h; SD 00:48) and woke early (09:26 h; SD: 01:00). Delayed (> 20 min) sleep onset latency was observed in 7.4% of the children, and daytime sleepiness was reported by 6.9% of the participating children. The incidence of awakening during the night, sleep-disordered breathing and snoring was 13.9%, 1.2%, and 2.7% respectively. Most of the children shared a room with their parents (87.0%) ($P > 0.05$).

The sleep habits and sleep problems in each domain of the BEARS questionnaire are shown in Table 1. Table 2 compares the sleep problems reported by the mothers of the pre-school children in the present study with those in the literature.

Discussion

This study showed that sleep problems were prevalent among Iranian pre-schoolers and that the problems were similar among girls and boys of the same age. Among the sleep problem domains, the most common disorders reported by the mothers were the regularity and the duration of sleep. The boys and girls had similar sleep problems, and the BMI indexes were not significantly different. The mean bedtime of the girls and boys was 23:19 h and 23:16 h, respectively. Jalilolghader (8,19) found a similar (23.18 h) sleep onset time at night among 3–6 year-old) Mohamadi (10) reported that the bedtime of 2–6 year-old Iranian children was 23.52 h.

In previous studies (8,9,19), we demonstrated that Iranian pre-schoolers have poor sleep habits. The night-time sleep duration of 3–6 year-old (11.18 pm) Iranian children living in urban environments was shorter (9:32; SD 1:12 h), than those living in rural environments, and they had a later sleep onset time (21:00–23:00 h) (17). Compared with the existing reports in the literature (5,6), the 3–6 year-old in the current study had a higher rate of sleep problems, and these were not influenced by gender. In contrast, other studies reported that sleep problems were more common among Dutch (5) girls than among

Table 1: Frequency and percentages of sleep problems in each domain of BEARS questionnaire and sleep habits in 3–6 year-old children

Domains of BEARS and CSHQ	Girl		Boy		Total		P value
	N	%	N	%	N	%	
Bedtime problems							
Resistance to going to bed	48	17.1	55	18.3	103	17.7	0.201
Sleep onset latency	22	7.8	21	7.0	43	7.4	0.752
Excessive daytime sleepiness	20	7.1	20	6.6	40	6.9	0.871
Awakening during the night	41	14.6	41	13.7	81	13.9	0.602
R							
Regularity in bed time sleep	167	59.6	184	61.5	351	60.6	0.472
Regularity in afternoon sleep	132	47.1	149	49.8	281	48.5	0.416
Regularity in morning wakeup	209	74.6	232	77.5	441	76.1	0.209
duration of sleep (hours/day) ^a	10:57	00:48 (SD)	10:52	00:48 (SD)	10:54	00:48 (SD)	0.210
S							
Sleep disordered breathing	4	1.4	3	1.0	7	1.2	0.262
Snoring	7	2.5	9	3.0	16	2.7	0.805
Sharing bed room with parents	233	83.2	271	90.6	504	87.0	0.059

^aStudent t test used to compare mean (SD).

Chi-square test used to compare percentage of sleep problems in children.

Table 2: Comparison of percentage of sleep problems and harmful sleep habits of pre-school children in the literature^a

Domains of BEARS* and CSHQ questionnaires	Australia, 2004 (3)	Netherlands, Dutch, 2007, 2–13 y (5)	United States, 2–12 y, 2004 (6)	Iran, Tehran, 2007 (10)	Iran, Tehran 2009, 2–6 y (23)	Iran, current study Urban area, 2012
Bedtime problems (bedtime resistance, sleep onset latency)	12.8	15	16.3	56.4	28.9	24.4
Excessive daytime sleepiness		10	5.6	26.7	64.9	6.9
Awakening during the night	18.1		18.4	13.8	27.7	13.9
Regularity and duration of sleep	–	–	5.7	27.7	29.2	61.7
Sleep disordered Breathing	9.7	1	13.1	17.8	7.1	1.2

^aThe years are related to date of study not published article references, (3,5,6,10,23).^bPercentage of sleep problems (BEARS and CHSQ).

Dutch boys and that American boys slept for shorter periods than American girls slept (6). We found that 61.8% of the study group experienced problems with the 'regularity and duration of sleep' (Table 2) and that 76.1% had problems with the 'regularity of morning wakeup' (Table 1). In the present study, 87.04% of the 3–6 year-old shared a bedroom with their parents, in contrast to 44% of 2–7 year-old Swiss children. However, Swiss children who shared a bedroom with their parents had the highest percentage of 'night awakening' (7). In addition to socio-cultural factors, which affect sleep habits and, probably, cause sleep problems (13), children aged up to 8 years who shared a bed tended to sleep significantly less than non-bed-sharing children (14).

Previous studies (8,19) showed that girls had a longer night-time sleep duration than boys, whereas the current study and a Dutch study (5) found no gender difference. The sleep duration was significantly shorter in co-sleepers, night-time walkers and bedtime resisters up to 10 years of age in other studies (20, 21). In addition, bedtime resistance was significantly higher in bedroom sharers (5). Compared with the existing literature, pre-school children in Iran have a higher percentage of sleep problems.

The bedtime problems of the Iranian pre-schoolers in the present study were lower than those of Swiss children (7) but higher than those of Japanese (22), Australian (3) and American (1,6) children. The rate of bedtime problems seems to be similar among Iranian (8) and Finnish (21) children. Interestingly, the same range of sleep-disordered breathing (7–17%) was reported in studies conducted in China (13), Finland (21), Switzerland (7), Japan (22) and the US. (1,6). The prevalence of sleep-disordered breathing in Dutch 2–13 year-old was 1% (5), which is the lowest among all the studies. Different percentages of sleep-breathing disorder were reported in Iranian pre-schoolers. In Tehran, Iran (2007, 2013) (10,23) and the current study, 17.8%, 7.1%, and 1.2% were reported, respectively. Sleep-breathing disorder is most prevalent in 2–6year-old due to adenotonsillar hypertrophy (12). In adolescents, the problem may be due to obesity (12). Obesity was not observed among the Iranian children in the current study. The cited studies did not include information on the weight and obesity of the participants.

This study has some limitations. The sampling included only children living in a small city. Therefore, the findings cannot be generalised to the whole country. In addition, the results are

based on data obtained from questionnaires and not laboratory sleep studies. Furthermore, we did not compute the glycaemic index of meals or snacks before bedtime. High-glycaemic-index carbohydrate meals shorten sleep onset, improve sleep quality and consequently reduce sleep problems (24). This might be a confounding factor in the results of the current study. We recommend further studies to assess the effect of different factors, such as geographic area, seasonal changes and diet, including the glycaemic index, on the sleep habits of Iranian children.

Conclusion

In conclusion, different factors affect healthy sleep. The current study showed that Iranian pre-schoolers have short sleep duration and that they are late sleepers. The late bedtime may result in problems. Not putting children to bed until some hours after they are tired may make them less resistant to sleeping. However, a delayed bedtime may have implications for bed sharing, daytime behaviour, daytime sleepiness and morning wake-up times. The high percentage of sleep problems in children highlights the importance of paying attention to sleep in primary care practice.

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Conflict of Interest

None.

Funds

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Authors' Contributions

Conception and design, drafting of the article, final approval of the article and obtaining of funding: MJ

Analysis and interpretation of data and statistical expertise: AJ

Critical revision of the article for important intellectual content: NK

Collection and assembly of data: SJ

Drafting of the article and obtaining of funding: HM

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